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Principal Examiner Feedback

November 2011

GCSE Mathematics (5383H)
Paper 10 (Calculator)

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1. PRINCIPAL EXAMINER'S REPORT – HIGHER PAPER 10

1.1. GENERAL COMMENTS

1.1.1. The variety of questions in this paper seemed to provide a suitable degree of challenge to candidates of all abilities suited for entry to a higher tier paper. It was clear however that a number of candidates would have been better advised to take the Foundation tier instead of the Higher. Candidates who found all of the early questions very challenging may have been better suited to entry at the Foundation tier.

1.1.2. The performance of candidates on questions 1-3 and 7 was generally good.

1.1.3. The performance of candidates on questions 8 and 10 involving the simplification of algebraic fractions was disappointing.

1.2. REPORT ON INDIVIDUAL QUESTIONS

1.2.1. Question 1

Over 70% of candidates were able to give a fully correct and fully simplified expression. Of those candidates who did not give a fully correct response, most of them were awarded one mark for one term correct. Any loss of marks in this question seemed to be due to a confusion with signs. Answers such as $4c - d$, $4d - 2c$, $4c + 8d$, and $2c + 8d$ were common. Final expressions involving terms in c^2 and d^2 were also seen by examiners

1.2.2. Question 2

Some candidates worked out the value of $2^3 \times 2^5$ whilst other candidates misread or misunderstood the question and gave their answer in the form of a number squared, for example 16^2 rather than as a power of 2. Other commonly seen incorrect responses included 128^2, 2^{15}, 4^8 and 4^{15}. Just under two thirds of candidates were successful in this question

1.2.3. Question 3

A relatively small proportion of candidates used a calculation based on

$\frac{17.5}{100} \times 720 (= 0.175 \times 720)$, which can be evaluated quickly with the aid of a calculator and where the method can be written down clearly and concisely. Instead, the majority of candidates used the method of breaking down 17½% into constituent parts. Those candidates who attempted to work out 10%, 5%, 2½% and then add their results were more often successful than those who attempted to use 10%, 5%, 1%, ½%. The latter group of candidates usually either did not demonstrate a full method, for example working out 17% rather than 17½%, or they did not show their method in sufficient detail and made arithmetic errors. These candidates could not be awarded any credit. Approximately 70% of candidates were awarded 2 marks for their response to this question with a further 4% of candidates achieving 1 mark.

1.2.4. Question 4

The success rate for the first part of this question was disappointing with 42% of candidates working out the size of the angle successfully. "58°" was the most commonly seen incorrect answer but "104°" and "122°" were also often seen.

Answers to the second part of the question rarely included a full set of reasons. The great majority of candidates gave reasons rather than repeat their working out but they usually restricted themselves to one reason. The question clearly asked for "reasons" rather than "a reason" and candidates should be advised to give all reasons relevant to their chosen method.

1.2.5. Question 5

Many candidates seemed unprepared to draw a straight line with an equation in the form $ax + by = c$. Rarely was there any evidence that candidates had a strategy to deal with equations which are not in the form $y = mx + c$. Where candidates had attempted to construct a table of values, little accompanying working was shown and tables were often incorrect. It appeared from the more successful attempts at drawing the line that candidates may have found values of x and y which satisfied the equation by trial and improvement. Incorrect lines seen were many and varied but usually had a positive gradient. About one quarter of candidates scored full marks on the question with a further quarter of candidates scoring 1 or 2 marks.

1.2.6. Question 6

The best candidates produced clear, concise and accurate responses to this question. This was quite rare however and candidates found using consistent units and using the relationship between volume, mass and density all within one question very challenging. Most candidates realised the need to work out the volume of the metal bar and most showed themselves able to calculate the volume of a triangular prism, but only a small proportion of these candidates identified the need to use consistent units (either cm or m) and the most common value used for the volume of the bar was 1600 presumably from $20 \times 20 \times 8 \div 2$. Many candidates did not know what to do from there to solve the problem. Some candidates added the volume to the mass while others multiplied the volume by the mass. Of those candidates who recognized they needed to use the relationship between volume, mass and density only a small proportion could use the relationship correctly. Much of the working shown was disorganised and the expression of a division was often expressed incorrectly on paper. For example, it was common to see $"\frac{1600}{1424} = 0.89"$.

The presence of "89" in working suggested to many candidates that the bar was made of copper. Very few candidates seemed to question why they had values of 8.9×10^{-3} or 0.89 and not 8900 for the density of the material. Only about one quarter of candidates scored any marks for their response to this question.

1.2.7. Question 7

The question was well answered with 73% of candidates being awarded full marks. Incorrect answers most commonly resulted from candidates working out the value of $\sqrt{2.3}\times 4.6^2$, an answer obtained without considering the order of operations required. Some candidates rounded their answer despite the instruction in the question to "write down all the figures on you calculator display". Few candidates recorded any intermediate working, but a large proportion of those who did, gained 1 mark. Some candidates seemed to ignore the square root sign. Candidates who checked their working might have found such an error.

1.2.8. Question 8

This question .was poorly attempted. Most candidates clearly had little idea how to simplify algebraic fractions. Attempting to expand the brackets as a first step was common in part (a) of the question.
Expressions such as "$3x + 3 + 3x + 3$" were quite common. Unfortunately even those candidates who showed some understanding of what was required often gave their final answer as $3x + 1$. Less than one in five candidates were awarded the mark available in part (a). A significant number of candidates did not attempt part (b) of the question. When they did, the error of interpreting $4x^2$ as $(4x)^2$ and then writing $16x^2$ was common. Some candidates added or multiplied the "4" and "6". Fewer than 1 in 10 of candidates were awarded both marks in part (b) of the question. A similar proportion of candidates were awarded 1 mark for a partially simplified. expression.

1.2.9. Question 9

Nearly 60% of candidates gained some credit for their answer to this question. Many candidates identified a right angle between a radius and a tangent but failed to make any further progress with the question. This was usually because they did not realise the need to either join *O* to *T* or *S* to *T*. Of those who did join *O* to *T* a common error was to treat angles *ROT* and *ORT* as equal angles in the isosceles triangle formed. Many candidates attempted to work out the angle at *R* or the angle at *T* in the quadrilateral *SPTR*. About one fifth of candidates gave the correct final answer with the best candidates also presenting a clear concise method in the working space.

1.2.10. Question 10

More able candidates clearly recognized the need to factorise the numerator and denominator of the fraction and the best candidates produced concise and accurate solutions to gain all 3 marks available. Many candidates gained credit for factorising either the numerator or the denominator correctly, usually for writing $x^2 - y^2$ as $(x - y)(x + y)$. Incorrect factorisation often led to expressions such as $(x - y)(x - y)$, $(2x + x)(y + y)$ and $(2x + y)(x - y)$. Few candidates seemed to check their factorisation by multiplying out brackets.

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